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Section 3

Water Quantity

This section addresses water quantity issues (availability and use), while water quality in the Ogeechee basin is the subject of Section 4. Water use in the Ogeechee River Basin is measured by estimates of freshwater withdrawn from groundwater and surface water. Uses of water include both consumptive and nonconsumptive uses.

Surface water is the primary water source in the Piedmont Province of the Ogeechee River basin because ground water yields from crystalline rock aquifers tend to be low. Within the Coastal Plain province, aquifer yields are higher and ground water withdrawals are an important part of the total water budget. Although most public-supply withdrawals in the Piedmont Province are from surface-water sources, with the exception of counties near or immediately below the Fall Line, most public-supply water in the Coastal Plain comes from ground water sources. The Floridan aquifer system supplied most of the ground water used in the basin in 1990, followed by the Claiborne, Clayton, Piedmont crystalline rock, and the Providence aquifer systems. As previously mentioned, the two sources of supply are not independent, because ground water discharge to streams is important in maintaining dry-weather flow. Thus, withdrawal of ground water can, under certain conditions, also result in reduction in surface water flow.

Water use in the Ogeechee River Basin is expected to remain stable in the near future due to average population growth rates.

In the following sections, water availability is discussed from a number of viewpoints. First, the important topic of drinking water is presented, which includes both surface and ground water supplies. Then, general surface water availability is presented, followed by ground water availability.

3.1 Drinking Water Supply

3.1.1 Drinking Water Supplies in the Ogeechee River Basin

The Ogeechee River basin provides drinking water for nearly 394,000 people in the state of Georgia by municipal or privately owned public water systems. A public water system pipes water for human consumption and has at least 15 service connections or

regularly serves at least 25 individuals 60 or more days out of the year. Public water system sources include surface water pumped from rivers and creeks or ground water pumped to the surface from wells or naturally flowing from springs. There are three different types of public water systems: community, non-community non-transient, and non-community transient.

Types of Public Water Systems

A community public water system serves at least 15 service connections used by year round residents or regularly serves at least 25 year-round residents. Examples of community water systems are municipalities, such as cities, counties, and authorities which serve residential homes and businesses located in the areas. Other types of community public water systems include rural subdivisions or mobile home parks which have a large number of homes connected to a private public water system, usually a small number of wells.

A non-community non-transient public water system serves at least 25 of the same persons over six months per year. Examples of non-community non-transient systems are schools, office buildings, and factories which are served by a well.

A non-community transient public water system does not meet the definition of a non-community non-transient system. A non-community transient public water system provides piped water for human consumption to at least 15 service connections or which regularly serves at least 25 persons at least 60 days a year. Examples of a non-community transient are highway rest stops, restaurants, motels, and golf courses.

Private domestic wells serving individual houses are not covered by the state's public water system regulations. However, the regulations for drilling domestic wells are set by the Water Well Standards Act and the local health department is responsible for insuring water quality.

In the Ogeechee River basin there is one community public water system utilizing surface water and serves 2,800 people and 355 community public water systems utilizing ground water and serving approximately 368,000 people (Table 3-1). The locations of surface water intakes within each of the Hydrologic Units of the Ogeechee River basin are shown in Figures 3-1 through 3-4.

Table 3-1. Community Public Water Systems in the Ogeechee River Basin

Drinking Water Permit Number	Water System Name	County
HUC 03060201		
GA0330001	Midville	Burke
GA0330003	Vidette	Burke
GA1070004	Summertown	Emanuel
GA1250000	Gibson	Glascock
GA1250001	Mitchell	Glascock
GA1250004	Edgehill	Glascock
GA1330001	Siloam	Greene
GA1330003	White Plains	Greene
GA1410002	Hancock Co-Mayfield	Hancock
GA1410019	Hancock Co-GA15e/Devereau	Hancock
GA1630000	Avera	Jefferson
GA1630001	Bartow	Jefferson
GA1630002	Louisville	Jefferson

Drinking Water Permit Number	Water System Name	County
GA1630003	Stapleton	Jefferson
GA1630004	Wadley	Jefferson
GA1630015	Jefferson County Water System	Jefferson
GA1650000	Millen	Jenkins
GA1650001	Perkins Water Authority	Jenkins
GA2650000	Crawfordville	Taliaferro
GA2650007	The New Frontier-Fena Inc.	Taliaferro
GA3010001	Warrenton	Warren
GA3010004	Norwood	Warren
GA3030005	Sandersville	Washington
HUC 03060202		
GA0290000	Richmond Hill	Bryan
GA0290004	So Atl-Black Creek Farms Subdivision	Bryan
GA0290006	Bryan Woods Estates	Bryan
GA0290008	Ft. McAllister/Cape Hardwicke	Bryan
GA0290009	Lake Lorraine Subdivision	Bryan
GA0290011	Strathy Hall Subdivision	Bryan
GA0290012	Mill Hill Landing	Bryan
GA0290013	Black Creek Farms West	Bryan
GA0290014	Bar D Ranch Subdivision	Bryan
GA0290015	Coastal Chlor-Briarwood Subdivision	Bryan
GA0290021	Coastal Chlor-the Cove Subdivision	Bryan
GA0290022	Holly Hill Subdivision	Bryan
GA0290023	Bryan Woods Estates Phase III	Bryan
GA0290029	Gardner Estates	Bryan
GA0290031	Kens Mobile Home Park	Bryan
GA0290036	Richmond Hill Mobile Home Park	Bryan
GA0290066	Redbird Creek	Bryan
GA0290071	Waterford Landing	Bryan
GA0290073	Strathy Hall Two Subdivision	Bryan
GA0290076	Oxford Subdivision	Bryan
GA0290084	Black Creek Development	Bryan
GA0310000	Brooklet	Bulloch
GA0310002	Portal	Bulloch
GA0310004	Statesboro	Bulloch
GA0310013	Leefield Water Assoc., Inc.	Bulloch
GA0310016	Grove Lakes Subdivision	Bulloch
GA0310033	Tankersley Subdivision	Bulloch
GA0310034	Windfield Subdivision	Bulloch
GA0310040	Riverside Estates	Bulloch
GA0310049	Frankville Water Association	Bulloch
GA0310052	Coach House Estates Mobile Home Park	Bulloch
GA0310053	Colonial Heights Subdivision	Bulloch
GA0310060	Mill Creek Estates	Bulloch
GA0310061	Lakeside Estates	Bulloch
GA0310062	Newtons Mobile Home Village	Bulloch
GA0310068	Thomas Village	Bulloch
GA0310071	Westchester Subdivision	Bulloch
GA0310075	Frinks Trailer Park	Bulloch
GA0310140	Zetterower Mobile Home Park	Bulloch

Drinking Water Permit Number	Water System Name	County
GA0310165	Georgian Walk Subdivision	Bulloch
GA0310166	Eldora Farms Subdivision	Bulloch
GA0310167	Mill Creek Landing	Bulloch
GA0310171	Deerfield Subdivision	Bulloch
GA0310172	Northwood Subdivision	Bulloch
GA0310174	Chance`s Mobile Home Park	Bulloch
GA0310177	Old Mill Pond Subdivision	Bulloch
GA0310180	Timberland Points	Bulloch
GA0310183	Hunters Point Subdivision	Bulloch
GA0310187	English Oaks Mhp	Bulloch
GA0310188	Olney Station	Bulloch
GA0310189	Plantation Mobile Estates	Bulloch
GA0310190	Yorktown Subdivision	Bulloch
GA0310193	Brannen Mobile Home Park	Bulloch
GA0310199	Westside Mobile Home Park	Bulloch
GA0310201	Oak Hill Mobile Home Park	Bulloch
GA0310202	Middleground Plantation	Bulloch
GA0310203	Pretoria Station/Brookwood SD	Bulloch
GA0310206	Inman Lakes Subdivision	Bulloch
GA0310211	Old Indian Trail WS	Bulloch
GA0310212	Westboro Apartments	Bulloch
GA0310213	Cody Lane Mobile Home Park	Bulloch
GA0310214	Greenwood Trailer Park	Bulloch
GA0510025	Atlantic Ws-argyle Est	Chatham
GA0510085	Atlantic Ws-oliver Pines	Chatham
GA0510114	Bellaire Village Subdivision	Chatham
GA0510129	Chatham Co.-Burroughs Comm.	Chatham
GA0510129	Chatham Co.-Burroughs Comm.	Chatham
GA0510157	Atlantic Ws-riverside Estates	Chatham
GA0510223	J. R. Rogers Mobile Home Ct.	Chatham
GA0510249	Argyle Village Subdivision	Chatham
GA0510253	Riverbluff Subdivision	Chatham
GA0510267	Sandy Bluff Subdivision	Chatham
GA1030000	Guyton	Effingham
GA1030011	Meldrim Lakes	Effingham
GA1030016	Lakeside W Co-Foxbow Farms	Effingham
GA1030017	Foxbow North Subdivision	Effingham
GA1030086	Clearview Subdivision	Effingham
GA1030095	Wrph Ltd-Pine Hill S/d	Effingham
GA1030097	Lee Village Subdivision	Effingham
GA1030102	River Road Farms	Effingham
GA1030104	Cypress Lakes Subdivision	Effingham
GA2510001	Newington	Screven
GA2510002	Oliver	Screven
GA2510013	Green Acres Mobile Home Park	Screven
GA2510014	Indigo Mobile Estates	Screven
GA2510044	Rocky Ford	Screven
GA2510048	Hillcrest Heights	Screven
GA2510053	Blue Hole Mobile Home Park	Screven

Drinking Water Permit Number	Water System Name	County
HUC 03060203		
GA0290001	Pembroke	Bryan
GA0310001	Nevils Water Association	Bulloch
GA0310003	Register	Bulloch
GA0310006	Georgia Southern University	Bulloch
GA0310014	Mixon`s Mobile Village	Bulloch
GA0310015	Forest Heights Subdivision	Bulloch
GA0310017	Johnson Mobile Home Park	Bulloch
GA0310025	The Barn Mobile Home Park	Bulloch
GA0310028	Lake Collins Estates	Bulloch
GA0310031	Lanier Mobile Home Park	Bulloch
GA0310035	Hazelwood Subdivision	Bulloch
GA0310036	Country Club Hills/Pine Forest	Bulloch
GA0310037	Forest Hills Subdivision	Bulloch
GA0310038	Country Lakes Estates Mobile Home Park	Bulloch
GA0310041	New Hope Subdivision	Bulloch
GA0310055	Cypress Lake Mobile Home Park	Bulloch
GA0310149	Woodland Mobile Estates	Bulloch
GA0310168	Meadow Lakes Plantation Subdivision	Bulloch
GA0310169	Westridge Subdivision	Bulloch
GA0310170	Hodges Subdivision	Bulloch
GA0310173	Cedarwood Mobile Home Park	Bulloch
GA0310175	Williford Trailer Park	Bulloch
GA0310178	Bird Road Trailer Park	Bulloch
GA0310184	Southern Comfort Subdivision	Bulloch
GA0310185	On the Pond Subdivision	Bulloch
GA0310191	Horizons West Subdivision	Bulloch
GA0310192	Dry Branch Village	Bulloch
GA0310194	Lundy Trailer Park	Bulloch
GA0310195	Country Walk Subdivision	Bulloch
GA0310197	Gallop Mobile Home Park	Bulloch
GA0310198	Heritage Mobile Home Park	Bulloch
GA0310204	Westover Subdivision	Bulloch
GA0310205	Bradford Place	Bulloch
GA0310216	Star Line Heights Apts.	Bulloch
GA0310229	Pine Inn Estates	Bulloch
GA0430000	Metter	Candler
GA0430001	Pulaski	Candler
GA0430003	Daniel Village Mobile Home Park	Candler
GA1030018	Pecan Grove Subdivision	Effingham
GA1030028	Pineora System	Effingham
GA1070001	Garfield	Emanuel
GA1070003	Stillmore	Emanuel
GA1070005	Swainsboro	Emanuel
GA1070006	Twin City	Emanuel
GA1070031	Country View Estates Mobile Home Park	Emanuel
GA1070032	Ogburn Subdivision	Emanuel
GA1090000	Bellville	Evans
GA1090001	Claxton	Evans
GA1090002	Daisy	Evans

Drinking Water Permit Number	Water System Name	County
GA1090003	Hagan	Evans
GA1090006	Evans Memorial Hospital	Evans
GA1090007	Claxton-evans County Industrial Park	Evans
GA1090037	Winnmeir Subdivision	Evans
GA1090038	La Casa Carmen Subdivision	Evans
GA1790018	Roberts Properties	Liberty
GA1790022	Oakview Mobile Home Park	Liberty
GA1790024	Usa-fort Stewart Main	Liberty
GA1790027	Palms West Mobile Home Park	Liberty
GA1790029	Victory Manor Mobile Home Park	Liberty
GA1790032	Guyett Rentals (Bucks Mobile Home Park)	Liberty
GA1790034	Oak Hill Estates Mobile Home Park	Liberty
GA1790046	Mossy Oak Trailer Park	Liberty
GA1790093	Deerfield Mobile Home Park	Liberty
GA1790096	Westgate Mobile Home Park	Liberty
GA1790127	Alsennia`s Trailer Park	Liberty
GA1790128	Cowart Subdivision	Liberty
GA1790134	Live Oak Mobile Home Park	Liberty
GA1790135	Zorn Subdivision	Liberty
GA1790136	Woodridge Community Mobile Home Park	Liberty
GA1830005	Horse Creek Trailer Park	Long
GA1830010	Middleton Mobile Village	Long
GA1830020	Taylors Creek Mobile Home Park	Long
GA1830031	Mcdonald Village	Long
GA1830032	Pine Crest Mobile Home Park	Long
GA2670000	Cobbtown	Tattnall
GA2670003	Manassas	Tattnall
HUC 03060204		
GA0290005	Bryan Acres Subdivision	Bryan
GA0290010	Lincoln River Estates	Bryan
GA0290020	B & B Water Works	Bryan
GA0290024	The Bluff-Belle Island	Bryan
GA0290025	Tivoli Marsh Water System	Bryan
GA0290053	Shuman Trailer Park	Bryan
GA0290063	Heron Point Subdivision	Bryan
GA0290064	Bailey Plantation Subdivision	Bryan
GA0290067	Quail Hamlet Subdivision	Bryan
GA0290068	Sayle`s Landing Subdivision	Bryan
GA0290069	Jerico Subdivision	Bryan
GA0290070	Oak Pointe Subdivision	Bryan
GA0290075	Cranston Bluff Subdivision	Bryan
GA0290080	Buckhead Development	Bryan
GA0290083	Hope Creek Plantation	Bryan
GA0290085	Marsh Harbor	Bryan
GA0290086	Brigham Lakes Subdivision	Bryan
GA0510001	Pooler	Chatham
GA0510003	Savannah-Main	Chatham
GA0510005	Tybee Island	Chatham
GA0510006	Thunderbolt	Chatham

Drinking Water Permit Number	Water System Name	County
GA0510011	Golden Isles Subdivision	Chatham
GA0510012	Grove Hill Subdivision	Chatham
GA0510014	Azalea Mobile Home Plaza	Chatham
GA0510015	Water's Bluff Mobile Home Park	Chatham
GA0510016	Bloomingtondale	Chatham
GA0510017	Crosby Mobile Estates	Chatham
GA0510021	Cottonvale Estates	Chatham
GA0510022	Dyches Mobile Estates	Chatham
GA0510023	East Pines Subdivision	Chatham
GA0510024	Estill Hammock/Spanish Hammock	Chatham
GA0510026	Garden Acres Estates	Chatham
GA0510027	Savannah-Dutch Island	Chatham
GA0510027	Savannah-Dutch Island	Chatham
GA0510028	Grays Subdivision	Chatham
GA0510030	Harbour Creek Subdivision	Chatham
GA0510031	Holiday Mobile Park	Chatham
GA0510033	The Landings Subdivision	Chatham
GA0510034	Larchmont Utilities	Chatham
GA0510035	Nortons Trailer Park	Chatham
GA0510036	Atlantic WS-Ogeechee Farms	Chatham
GA0510038	Parkersburg Subdivision	Chatham
GA0510038	Parkersburg Subdivision	Chatham
GA0510040	Atlantic WS-Pine Barren Acres	Chatham
GA0510042	Plantation Inn Mobile Estates	Chatham
GA0510044	Chatham WC-Rio Vista/Burnside	Chatham
GA0510046	River Oaks Subdivision	Chatham
GA0510047	Skidaway Mobile Estates	Chatham
GA0510049	Southside Mobile Estates	Chatham
GA0510050	Southwinds Community	Chatham
GA0510051	Savannah Pines Mobile Home Park	Chatham
GA0510052	Talahi Island Community	Chatham
GA0510054	The Bluff Subdivision	Chatham
GA0510055	Vicks Mobile Home Park	Chatham
GA0510056	White Oaks Subdivision	Chatham
GA0510060	Savannah Yacht & Country Club	Chatham
GA0510079	Morgan Mobile Home Park	Chatham
GA0510080	Melody Acres Park	Chatham
GA0510081	Savannah-Georgetown Community	Chatham
GA0510089	Nassau Woods Mobile Home Park	Chatham
GA0510091	Commodore Point	Chatham
GA0510094	Whitemarsh Estates	Chatham
GA0510096	Chatham Co.-Runaway Point	Chatham
GA0510096	Chatham Co.-Runaway Point	Chatham
GA0510098	Ennis Mobile Home Park	Chatham
GA0510099	Chatham Co.-Montgomery Area	Chatham
GA0510099	Chatham Co.-Montgomery Area	Chatham
GA0510100	Bethesda Home for Boys	Chatham
GA0510103	Lakeside Mobile Home Park	Chatham
GA0510104	Whitfield Park Subdivision	Chatham
GA0510107	Usa-hunter Af Main	Chatham

Drinking Water Permit Number	Water System Name	County
GA0510109	Chatham Co.-Glen of Robin Hood	Chatham
GA0510109	Chatham Co.-Glen of Robin Hood	Chatham
GA0510110	Foss Mobile Home Park	Chatham
GA0510111	Live Oak Mobile Home Park	Chatham
GA0510112	Shady Acres Mobile Home Park	Chatham
GA0510113	Grove Point Mobile Est.	Chatham
GA0510121	Beaulieu Village Subdivision	Chatham
GA0510123	Derrick Subdivision	Chatham
GA0510124	Chatham Co.-Little Neck Planta	Chatham
GA0510124	Chatham Co.-Little Neck Planta	Chatham
GA0510126	Miller Pines Mobile Home Park	Chatham
GA0510128	Chatham Co.-Modena on Skidaway	Chatham
GA0510128	Chatham Co.-Modena on Skidaway	Chatham
GA0510130	Candler General Hospital	Chatham
GA0510133	Chatham Co.-West Chatham Co.	Chatham
GA0510133	Chatham Co.-West Chatham Co.	Chatham
GA0510138	Bashlors Mobile Home Park	Chatham
GA0510139	Heathcote Farms Subdivision	Chatham
GA0510141	Whitfield Mobile Estates	Chatham
GA0510144	Riverview Mobile Inn	Chatham
GA0510163	Seabreeze Mobile Home Park	Chatham
GA0510229	Savannah-Wilmington Island	Chatham
GA0510235	Dean Forest Road Trailer Park	Chatham
GA0510250	Savannah-Whitemarsh Island	Chatham
GA0510259	Savannah-Wavannah Quarters	Chatham
GA0510266	B'dette Mobile Bluff	Chatham
GA0510275	Dean Forest Rd. Tp-north	Chatham
GA1030020	Meadowood Subdivision	Effingham
GA1030083	Goshen Apartments	Effingham
GA1030090	Creekwood Farms Subdivision	Effingham
GA1030099	Edwards Mobile Home Park	Effingham
GA1030107	South Pointe Subdivision	Effingham
GA1790000	Hinesville	Liberty
GA1790001	Midway	Liberty
GA1790004	Hillcrest Trailer Park	Liberty
GA1790005	Atlantic WS-Isle of Wight	Liberty
GA1790007	Lake George Subdivision	Liberty
GA1790014	Woodland Lakes	Liberty
GA1790017	W.D. Stanford Mobile Home Park	Liberty
GA1790020	Walthourville	Liberty
GA1790021	Westview Subdivision	Liberty
GA1790035	Riceboro	Liberty
GA1790037	Denmark Trailer Park	Liberty
GA1790048	C.r.stanford Apartments	Liberty
GA1790086	Fleming Estates Mobile Home Pk	Liberty
GA1790087	Salter Mobile Home Park	Liberty
GA1790094	Country Lane Mobile Home Park	Liberty
GA1790098	Sasser's Mobile Home Park	Liberty
GA1790104	Lakeview Trailer Park	Liberty

Drinking Water Permit Number	Water System Name	County
GA1790121	Blount's Subdivision	Liberty
GA1790122	Dutchman's Cove Subdivision	Liberty
GA1790123	The Pointe at Sunbury	Liberty
GA1790124	Glenbrook Mobile Home Park	Liberty
GA1790125	Halfmoon Villas & Marina	Liberty
GA1790129	Sequoia Mobile Home Park	Liberty
GA1790130	Pamona Lake Subdivision	Liberty
GA1790132	Seabrook Island Subdivision	Liberty
GA1790140	Brights Lake Subdivision	Liberty
GA1790143	Holly Hammock, Inc.	Liberty
GA1790145	Fair Haven Acres Mobile Home Park	Liberty
GA1830002	Twin Oaks Mobile Home Park	Long
GA1830006	Aaron Mobile Home Park	Long
GA1830008	Spring Creek Mobile Home Park	Long
GA1830011	Pine Meadows Mobile Home Park	Long
GA1830017	Country Manor Mobile Home Park	Long
GA1830024	Oak Meadows Mobile Home Park	Long
GA1830026	Carter Mobile Home Park	Long
GA1830027	Penny Acres Trailer Park	Long
GA1830028	Oak Ridge Mobile Home Park	Long
GA1830029	Stewart Pines Trailer Park	Long
GA1830039	Beaver Hill Mobile Home Park	Long
GA1910000	Darien	Mcintosh
GA1910003	Sapelo Gardens	Mcintosh
GA1910008	Sapelo Woods Subdivision	Mcintosh
GA1910009	John Alford Subdivision	Mcintosh
GA1910010	Mcintosh Co.-Youngs Island	Mcintosh
GA1910011	Mcintosh Co.-Briar Patch	Mcintosh
GA1910012	Mcintosh Co.-Jones Comm. Water Authority	Mcintosh
GA1910014	Mcintosh Co.-Cannon Bluff Water Authority	Mcintosh
GA1910015	Dnr-hog Hammock Community	Mcintosh
GA1910019	Mcintosh Co.-Carnigan Community	Mcintosh
GA1910020	Mcintosh Co.-Meridian Community	Mcintosh
GA1910021	Mcintosh Co.-Crescent Community	Mcintosh
GA1910023	Mcintosh Co.-Eulonia Community	Mcintosh
GA1910050	Belle Bluff Estates	Mcintosh
GA1910061	Mcintosh Co. Industrial Park	Mcintosh
GA1910067	Shell Point Subdivision	Mcintosh
GA1910069	Sutherland Bluff Plantation	Mcintosh
GA1910071	River Oaks Subdivision	Mcintosh
GA1910072	Belvedere Island	Mcintosh
GA1910073	Eagle Neck Subdivision	Mcintosh
GA1910074	Tolomato Spanish Mission	Mcintosh
GA1910076	Priester Estates	Mcintosh
GA1910084	Buccaneer Mobile Village	Mcintosh
GA1910087	Evergreen Mobile Home Park	Mcintosh
GA1910089	Mcintosh Co.-Harris Neck Community	Mcintosh
GA3030000	Davisboro	Washington
GA3030004	Riddleville	Washington

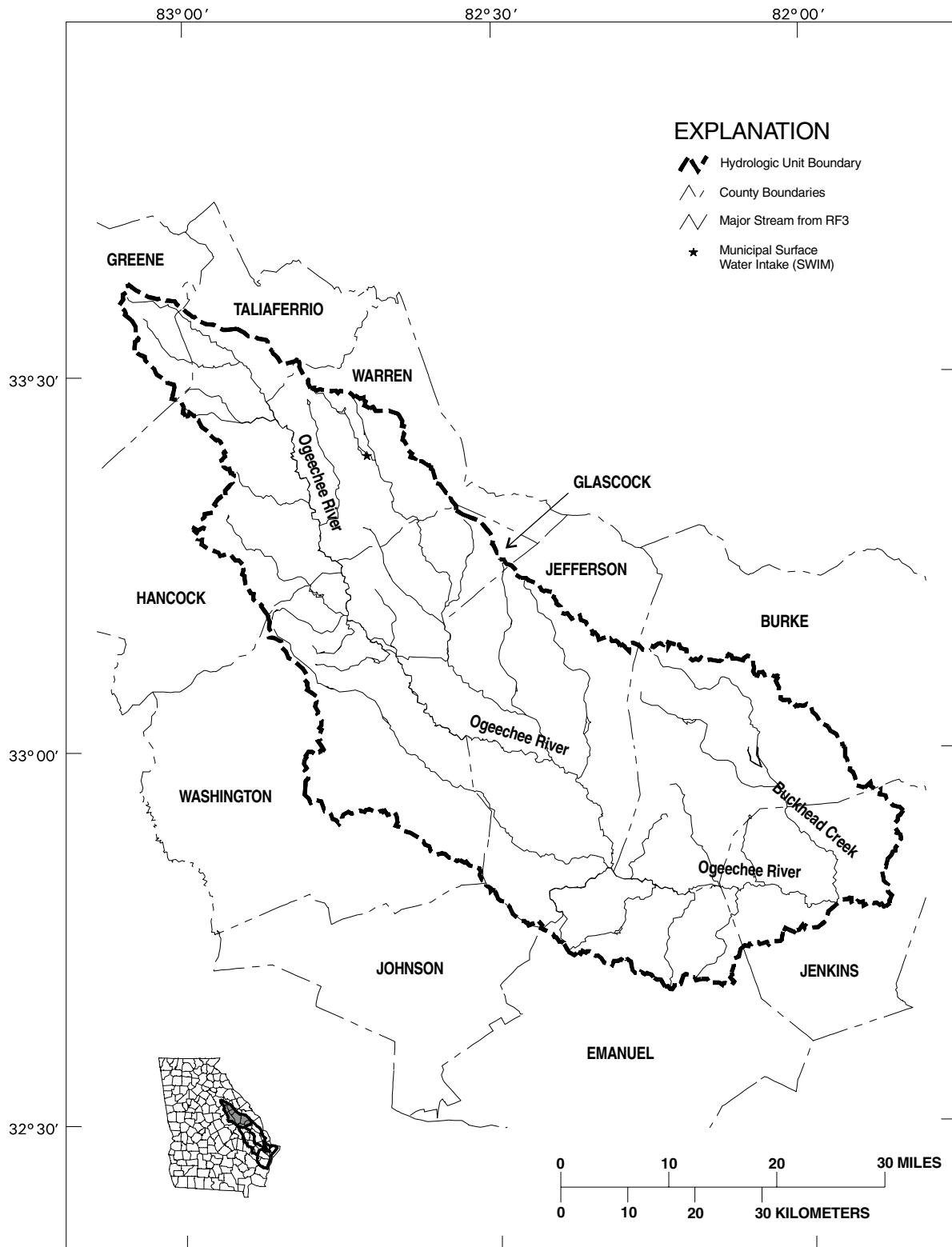


Figure 3-I. Surface Water Intakes, Ogeechee River Basin, HUC 03060201

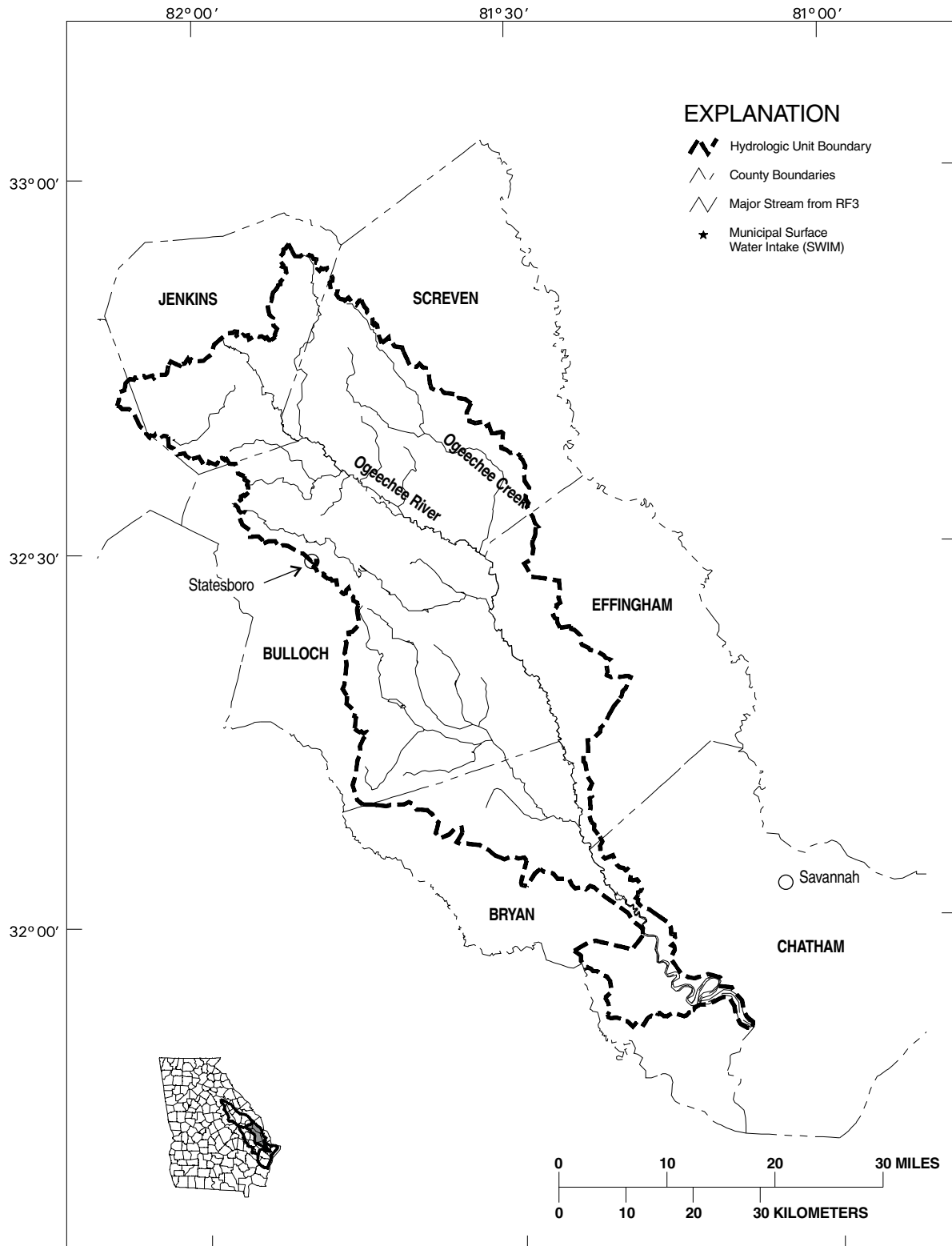


Figure 3-2. Surface Water Intakes, Ogeechee River Basin, HUC 03060202

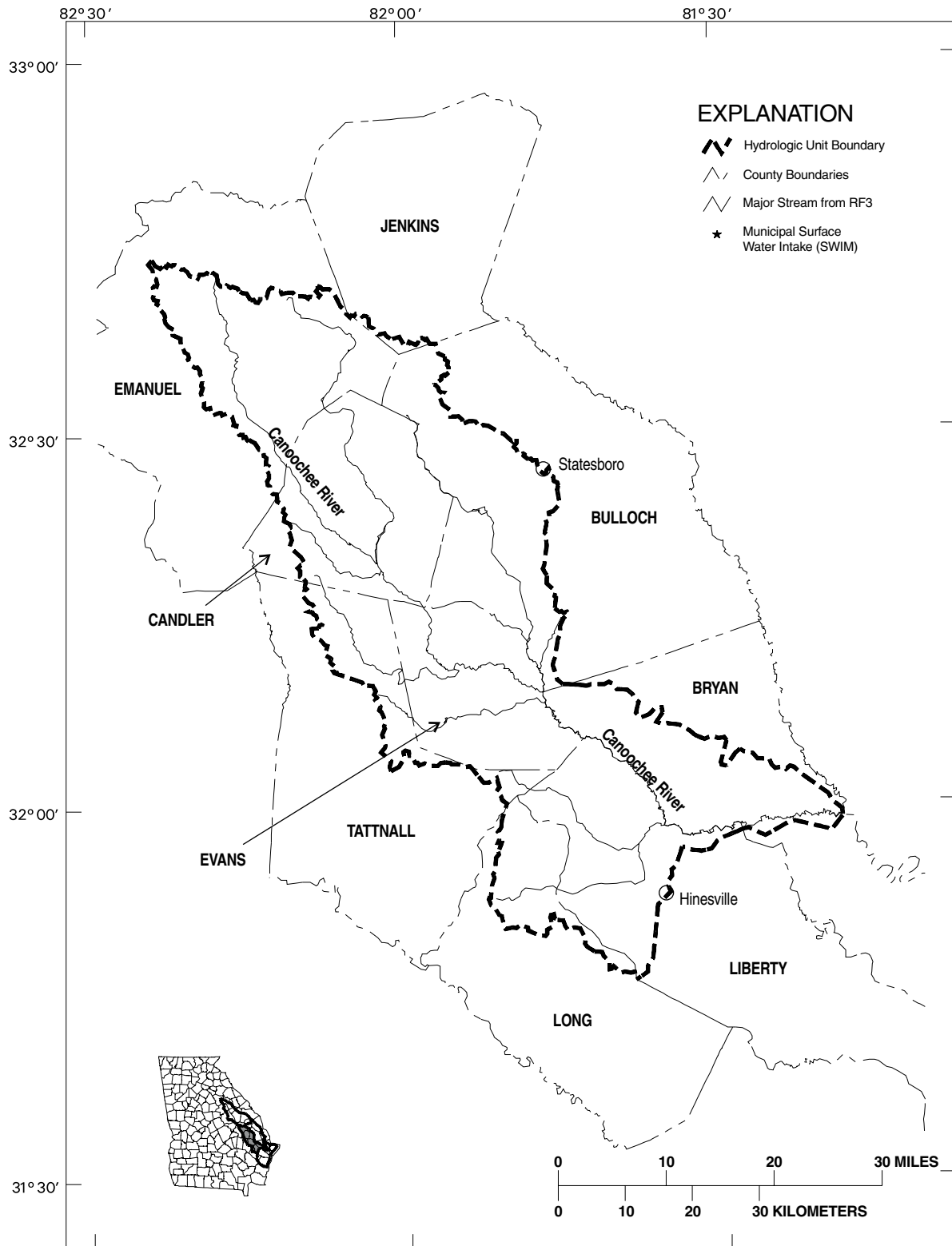


Figure 3-3. Surface Water Intakes, Ogeechee River Basin, HUC 03060203

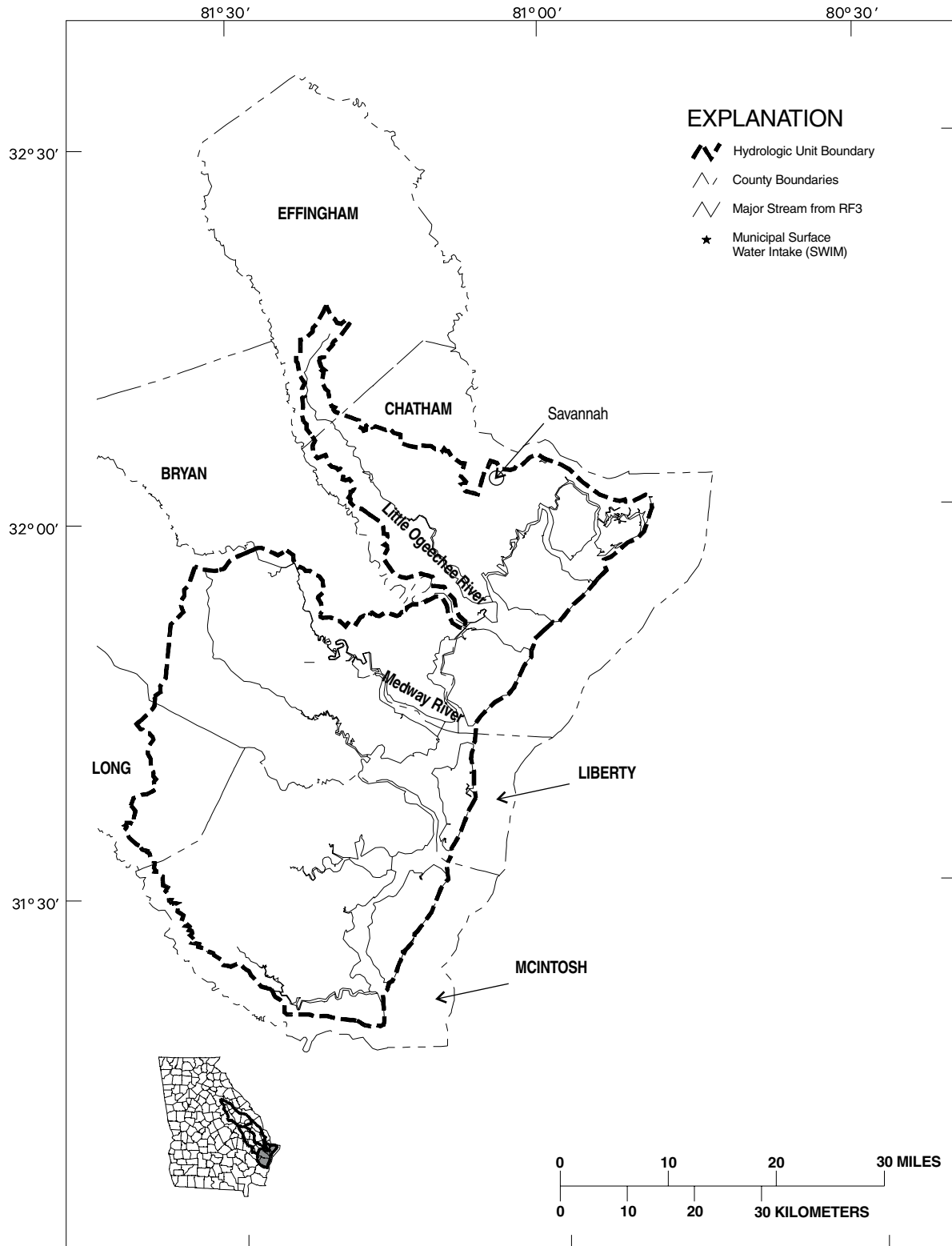


Figure 3-4. Surface Water Intakes, Ogeechee River Basin, HUC 03060204

3.1.2 Drinking Water Demands

Over the next few years there will be an increase in the use of groundwater to be used for drinking water from the Ogeechee River basin. One particular area of noted increase will be the coastal areas in McIntosh, Liberty, Long and Bryan counties. These counties are experiencing rapid growth in residential subdivisions and vacation homes. Another area of expected growth is Statesboro in Bulloch County. This coastal growth trend is expected to continue.

3.1.3 Drinking Water Permitting

The Georgia Safe Drinking Water Act of 1997, the Rules for Safe Drinking Water (391-3-5) adopted under the act require any person who owns and/or operates a public water system to obtain a permit to operate a public water system from the Environmental Protection Division. The permitting process has three phases: Inquiry and Discovery, Technical Review, and Permitting. During these phases the owners must provide a detailed description of the project; demonstrate the reliability of the water source; render engineering plans and specifications prepared by a professional engineer demonstrating the construction integrity of wells, treatment and distribution; conduct preliminary water sample testing; and legal documentation including an application to operate a public water system. Permits contain specific conditions the owner must meet for different types of public water systems, including a list of approved water sources, filter rates, disinfection and treatment requirements, compliance with sample testing schedule, and number of allowed service connections. Permits are issued for 10 years and are renewable.

3.2 Surface Water Quantity

3.2.1 Surface Water Supply Sources

The Ogeechee River Basin is a 5220 square-mile landmass in eastern Georgia. The Basin is drained by its 266 mile-long namesake Ogeechee River, which flows generally southeast to the Atlantic Ocean. This basin has the distinction of being the only one in the study area with any portion of its landmass within the Piedmont physiographic province.

As the basin's name implies, the major surface water body is the Ogeechee River. With its headwaters in Greene County, the Ogeechee collects water from smaller tributaries as it flows towards the coast, having an average annual flow at its mouth of about 4000 cubic feet per second (cfs). The 7Q10 at the mouth is a sizeable 300 cfs.

The Ogeechee River's largest tributary is the Canoochee River, which drains about 1400 square miles from the southwestern sector of the basin. The Canoochee discharges into the Ogeechee about 32 miles upstream of the Atlantic Ocean with an average annual flow of approximately 1200 cfs. At only 1.6 cfs, the 7Q10 of the Canoochee at its mouth is quite small.

Some of the other larger tributaries across the basin include Black Creek, Rocky Comfort Creek, Buckhead Creek, Williamson Swamp Creek, Canoochee Creek and Lotts Creek.

3.2.2 Surface Water Supply Demands and Uses

Municipal and Industrial Demand

Municipal and Industrial (M&I) water demands include public supplied needs such as residential, commercial, governmental, institutional, manufacturing and other demands such as distribution system losses.

Currently, the Ogeechee River basin contains only two surface water withdrawal permits, one industrial and one municipal. These are listed in Table 3-2, sorted by county. These permits are for users equal to or greater than 100,000 gallons per day. Users below this amount of surface water are not required to have a permit for their withdrawals.

Table 3-2. Surface water withdrawals

Facility	Type	Source	Mon Avg (Mgd)	Max Day (Mgd)	County
Thiele Kaolin	Industrial	Duhart Creek	1.50	1.75	Jefferson
Warrenton	Municipal	Rocky Comfort Creek	0.75	0.83	Warren

Agricultural Water Demand

Agricultural surface water demand in the Ogeechee River Basin is considerable. The counties to the north of the fall line are not generally used for farmland. Irrigated crops are grown throughout Emmanuel, Jenkins, Evans and Treutlen Counties. The Vidalia onion crop is centered in the Montgomery, Tooms, Candler, and Tattnal Counties in the area. Three nursery and pulp land irrigation is used in Tatnall and Bulloch Counties.

The demands on surface water resources for agricultural activities include irrigation for crops, nursery, and turf; drinking water for livestock and poultry; and, to a much lesser extent, water for aquacultural purposes.

As of 1993, the EPD had issued 843 agricultural permits for surface water withdrawal permits to entities located within the Ogeechee River basin. The combined permitted pumping capacity of these permits is 781,414 GPM (1125 MGD). According to the support information provided with each application, these permits are used to supply water to irrigate some 76,067 acres of crops, orchards, turf, etc.

Irrigated Acreage

The total water demand from agriculture, including both surface water and ground water demand, may be estimated using a variety of agricultural data collected by multiple sources. NRCS has attempted to combine this information for the purpose of estimating current and future agricultural water use in the basin. Table 3-3 shows historical irrigated acreage in the basin from 1974 to 1995.

Irrigated acres in the Ogeechee River basin grew from 3,025 in 1974 to an all time maximum for the basin of 104,300 in 1981. However, approximately 25,400 of these irrigated acres were lost between 1981 and 1984. Since 1984, irrigated acreage has varied above and below the 80,000 acre range to a 1995 total of 73,276 acres. Assuming the 1.8 percent annual growth rate observed in the Savannah River basin between 1984 and 1995 continues it will be experienced in the Ogeechee River basin as well, there will be approximately 112,774 acres under irrigation by 2020.

Table 3-3. Irrigated Acres in the Ogeechee River Basin, 1974-1995.

Ogeechee River Basin - Irrigated Acres					
	3060201	3060202	3060203	3060204	Basin Total
1974	323	613	2055	34	3025
1978	13090	14556	15548	58	43252
1979	21180	11707	17472	6	50364
1980	25885	26922	21892	113	74812
1981	36306	39918	27969	140	104333
1982	41599	33078	27394	469	102541
1984	30308	21994	26050	521	78874
1986	30779	23299	28159	555	82792
1989	31121	24147	28714	810	84791
1992	32963	22943	29954	1102	86963
1995	31727	19157	21585	808	73277

Source: USDA-NRCS estimates are based on county level data extrapolated to the basin.

Water Demand

Agricultural water demand is dependent upon a number of variables that include, but are not limited to, irrigated acreage, cropping mix and patterns, soil characteristics, climatic conditions, type of animal operation, best management practices, and market conditions. Water use in the Ogeechee River basin reflects the influence of these variables (Table 3-4). No distinct trend can be observed; however, from 1980 to 1995 there was a decrease of 3 MGD from 41 MGD in 1980 to 38 MGD in 1995.

Table 3-4. Historical Agricultural Water Use in the Ogeechee River Basin, 1980-1995.

Ogeechee River Basin - Agricultural Water Use					
	3060201	3060202	3060203	3060204	Basin Total
1980	14.24	15.09	10.95	0.97	41.25
1985	15.86	9.17	8.48	1.52	35.03
1987	17.96	11.79	8.64	1.22	39.61
1990	10.51	7.11	6.68	1.58	25.88
1995	14.03	11.78	9.84	2.62	38.27

Source: Georgia Geological Survey

Approximately 96 percent of the agricultural water used in 1995 was for irrigation purposes (36.74 MGD). The central portion of the basin just below the Fall Line is where the majority of agricultural irrigation occurs in the basin, the remaining 4 percent (1.53 MGD) was used for animal operations. Ground water sources provided 56 percent of the water used by this industry in 1995.

Future agricultural water demand is expected to increase slightly within the basin to 58.70 MGD by the year 2020. However, undesirable climate and market conditions could force producers to demand as much as 101 MGD on the projected 112,774 acres under irrigation by that time. Table 3-5 shows the likely range of agricultural water demand in the basin through the year 2020. The reader should note that significant increases in irrigated acreage will have the potential to result in a much higher demand.

Table 3-5. Projected water use in the Ogeechee River Basin, 1995-2020

Projected Water Use						
Ogeechee River Basin						
Irrigated Acres	<u>1995</u>	<u>2000</u>	<u>2005</u>	<u>2010</u>	<u>2015</u>	<u>2020</u>
1.8% growth	73276	79871	87059	94895	103435	112744
Irrigated Water Use						
High		71.29	77.71	84.70	92.33	100.64
Medium	38.27	41.59	45.33	49.41	53.86	58.70
Low		29.71	32.38	35.29	38.47	41.93
Animal Water Use		3.8	3.8	3.8	3.8	3.8
Total Water Use						
High		75.09	81.51	88.50	96.13	104.44
Medium		45.39	49.13	53.21	57.66	62.50
Low		33.51	36.18	39.09	42.27	45.73

Power Generation Water Demand

There are no power generating plants located within the Ogeechee basin that use the water resources of the basin.

Navigational Water Demand

There is no commercial navigation in the Ogeechee basin.

Recreation

Recreation activities in the Ogeechee River Basin includes fishing, camping, boating, swimming, picnicking, and other activities. Skidaway Island, Fort Mc Alister and Sapelo Island State Parks are located in the Ogeechee basin. Fort Morris and Fort King George Historic Sites are also located in the basin.

Waste Assimilation Water Demand

Water quantity, wastewater treatment, and wastewater discharge permitting are addressed in Section 4. However, it should be noted that the guidelines for discharge of treated effluent into the rivers and streams of the Ogeechee River basin assume that sufficient surface water flow will be available to assimilate waste and ensure that water quality criteria will be met.

Environmental Water Demands

EPD recognizes the importance of maintaining suitable aquatic habitat in Georgia's lakes and streams to support viable communities of fish and other aquatic organisms. A substantial portion of the Ogeechee watershed has been channelized for agricultural and silvicultural purposes. This has decreased the basins ability to retain rainwater and causes the river to rise and fall faster.

A significant issue that is receiving increasing attention from EPD is the minimum stream flow policy. EPD's current minimum stream flow policy is to protect the lowest seven-day average flow, which would have occurred during any ten-year period for a stream (commonly called the 7Q10). EPD is considering increasing the minimum flow requirement under recommendations of the Wildlife Resources Division.

3.2.3 Surface Water Withdrawal Permitting

The 1977 Surface Water Amendments to the Georgia Water Quality Control Act of 1964 require all non-agricultural users of more than 100,000 GPD on a monthly average (from any Georgia surface water body) to obtain a permit for this withdrawal from EPD. These users include municipalities, industries, military installations, and all other non-agricultural users. The statute stipulates that all pre-1977 users who could establish the quantity of their use prior to 1977 would be "grandfathered" for that amount of withdrawal. Table 3-2 lists the permits in effect in the Ogeechee River basin.

Applicants are required to submit details relating to the source of withdrawals, demand projections, water conservation measures, low flow protection measures (for non-grandfathered withdrawals), and raw water storage capacities. EPD issued permit identifies the source of withdrawal, the monthly average and maximum 24-hour withdrawal, the standard and special conditions under which the permit is valid, and the expiration date of the permit. The standard conditions section of the permit generally defines the reporting requirements (usually annual submission of monthly average withdrawals); the special conditions section of the permit usually specifies measures the permittee is required to undertake so as to protect downstream users and instream uses (e.g. waste assimilation, aquatic habitat). The objective of these permits is to manage and allocate water resources in a manner that both efficiently and equitably meets the needs of all the users.

Farm Irrigation Permits

The 1988 Amendments to the Water Quality Control Act establish the permitting authority within EPD to issue farm irrigation water use permits. As with the previously mentioned surface water permitting statute, the lower threshold is 100,000 GPD; however users of less water may apply for and be granted a permit. With two exceptions, farm use is defined as irrigation of any land used for general farming, aquaculture, pasture, turf production, orchards, nurseries, watering for farm animals and poultry, and related farm activities. One relevant exception is that the processing of perishable agricultural products is not considered a farm use.

Applicants for these permits who can establish that their use existed prior to July 1, 1988, and when these applications are received prior to July 1, 1991, are "grandfathered" for the operating capacity in place prior to July 1, 1988. Other applications are reviewed and granted with an eye towards protection of grandfathered users and the integrity of the resource. Generally, agricultural users are not required to submit any water use reports.

3.2.4 Flooding and Floodplain Management

The Ogeechee River basin was unaffected by the massive flooding that occurred in parts of Georgia in 1994, however, seventeen counties within the two basins were included in Federal Disaster Declaration #1209 as a result of the 1998 floods that affected a total of 115 counties across the state. The Floods of 1998 further substantiated the fact that flooding is the number one natural hazard in Georgia.

With the exception of Candler, Emanuel and Evans Counties, all disaster declared counties in the Ogeechee River basin participate in the National Flood Insurance Program (NFIP). Of the thirty-five counties associated with the basins, 62 percent are NFIP communities.

Floodplain development is a constant concern, because development within floodplain areas can increase flood levels, thereby increasing the number of people and the amount of property at risk. The term “floodplain management” is often used as a synonym for program or agency-specific projects and regulations. It is in fact quite a broad concept. Floodplain management is a continuous process of making decisions about whether flood plains are to be used for development and how they are to be developed.

The majority of communities in the Ogeechee River basin are impacted by riverine flooding. As for communities along the coast, they are susceptible to both riverine flooding and flooding from storm-induced waves. Coastal floodplain areas are divided into two adjacent zones that define the different degrees of hazard present. The V zone (velocity zone), as referenced on the community’s flood map, is that portion of the coastal 100-year floodplain that would be inundated by tidal surges with velocity wave action. The A zone is that portion of the 100-year floodplain not subject to wave actions (riverine flooding). The minimum standards established by the NFIP for construction in V zones differ significantly from the minimum standards for construction in coastal A zones (riverine areas). These minimum standards are incorporated into local flood ordinances adopted by communities as required for participation in the NFIP.

Floodplain Management Activities

To increase understanding and maintain a working knowledge of floodplain management, Georgia’s Floodplain Management Office periodically conducts training workshops throughout the State for local officials. On March 24, 1998 at the Regional Development Center (RDC) in Augusta a floodplain management workshop was held for elected officials and floodplain administrators from communities within the Savannah and Ogeechee River basins. On February 25, 1998, the City of Savannah was host to a floodplain management technical workshop for local building officials from coastal communities participating in the National Flood Insurance Program (NFIP). Savannah was also the site for a Community Rating System (CRS) workshop on November 18, 1997. The CRS is a Federal Emergency Management Agency (FEMA) program that rewards communities that implement floodplain management measures that exceed the minimum standards of the NFIP. Citizens within CRS communities receive discounts on their flood insurance premiums ranging from 5 percent to 45 percent. Chatham County and the cities of Pooler, Savannah and Tybee Island currently participate in the CRS.

The City of Savannah as well as Chatham County and neighboring Bryan, Liberty and McIntosh Counties in the Ogeechee River basin have joined a new effort of the Federal Emergency Management Agency (FEMA) to create more disaster resistant communities. This new initiative is called “Project Impact.” Project Impact works with state and local governments across the country to build communities that are more likely to withstand the ravages of natural disasters. The Savannah area’s low elevation makes it vulnerable to tidal flooding and hurricanes. Project Impact’s goal is to erase the ceaseless damage-repair-damage cycle by implementing preventive measures before disaster occurs.

3.3 Ground Water Quantity

3.3.1 Ground Water Sources

Generally the Ogeechee River basin in Georgia is divided into three groundwater regimes. North of the fall line is the Piedmont area, a region underlain by igneous and metamorphic crystalline basement rocks. Water is to be found in the overlying weathered zone, in cracks and crevices in the solid rock and in the zones of lithologic contacts. This lack of extensive aquifer greatly limits the amounts of groundwater that can be produced in the Piedmont, so most of the water used is from surface water.

In Washington, Jefferson, Glascock and northern Emanuel and western Burke counties, the aquifer of choice is the Cretaceous Sand aquifer. This is a sheet of sand and clay sediments deposited on top of the crystalline basement rock. While the aquifers can deliver a lot of water, high demands in concentrated areas may lead to extensive drawdown, since the aquifer cannot deliver large amounts of water quickly. This is of concern in the Kaolin areas, where extensive dewatering in the clay pits sometimes puts a local strain on the resource.

From Emanuel and Jenkins Counties south to the coast, the main groundwater source is the Floridan aquifer. This delivers tremendous amounts of water quickly, leading to very heavy municipal, industrial and agricultural usage from this source.

3.3.2 Ground Water Supply Demands

Municipal and Industrial Uses

Municipal and Industrial (M&I) water demands include public supplied and private supplied residential, commercial, governmental, institutional, manufacturing and other demands such as distribution system losses.

Existing permitted municipal and industrial groundwater users are shown on Table 3-6, by county. These permits are for users equal to or greater than 100,000 gallons per day. Users below this amount of groundwater are not required to have a permit for their withdrawals.

Agricultural Water Demand

Agricultural groundwater demand in the Ogeechee River basin is large. The counties to the north of the fall line are not generally used for farmland. Irrigated crops are grown throughout Emanuel, Jenkins, Evans and Treutlen Counties. The Vidalia onion crop is centered in the Montgomery, Toombs, Candler, and Tattnall counties in the area. Tree nursery and pulp land irrigation is used in Tattnall and Bulloch Counties. Generally these areas use the Floridan aquifer for their source of groundwater.

3.3.3 Ground Water Supply Permitting

Nonagricultural Permits

The Georgia Ground Water Use Act of 1972 requires permits from EPD for all non-agricultural users of ground water of more than 100,000 GPD. General information required of the applicant includes location (latitude and longitude), past, present, and expected water demand, expected unreasonable adverse effects on other users, the aquifer system from which the water is to be withdrawn, and well construction data. The permits

Table 3-6. Active Municipal and Industrial Ground Water Withdrawal Permits in the Ogeechee River Basin

County	Permit Number	Permit User Name	Permitted Monthly Avg W/D (MGD)	Permitted Yearly Avg W/D (MGD)	Permitted Aquifer
Bryan	015-0001	Richmond Hill, City of	1.500	1.500	Floridan
Bryan	015-0002	Pembroke, City of	0.500	0.256	Floridan
Bryan	015-0004	Sterling Bluff	0.350	0.350	Miocene
Bryan	015-0005	H.R. Blake & Associates (Waterford Landing)	0.271	0.271	Floridan
Bryan	015-0006	WL Grainger - Buckland Hall Plantation	0.020	0.020	Floridan
Bulloch	016-0001	Georgia Southern College	1.000	0.503	Floridan
Bulloch	016-0002	Statesboro, City of	3.218	2.700	Floridan
Bulloch	016-0003	Brooklet, Town of	0.165	0.150	Floridan
Bulloch	016-0004	Cooper Industries - Hand Tools	0.200	0.170	Floridan
Bulloch	016-0005	Brooks Instrument System - City of Statesboro	0.220	0.175	Floridan
Bulloch	016-0006	Grinnell Flow Control	1.008	1.008	Floridan
Candler	021-0001	Metter, City of	0.890	0.630	Floridan
Effingham	051-0005	Guyton, City of	0.270	0.220	Floridan
Emanuel	053-0003	Twin City, City of	0.300	0.250	Floridan
Evans	054-0001	Claxton, City of	0.386	0.300	Floridan
Evans	054-0002	Claxton Poultry Farms	1.500	1.500	Floridan
Jefferson	081-0002	Wadley, City of	0.450	0.450	Cretaceous Sand, Eocene Sand
Jefferson	081-0003	Louisville, City of	1.400	1.196	Cretaceous Sand, Eocene Sand
Jefferson	081-0005	Forstmann & Company - Louisville Plant	3.500	3.500	Cretaceous Sand
Jefferson	081-0008	Thiele Kaolin Co - Lamb Tract	3.000	3.000	Dublin - Midville, Gordon
Jenkins	082-0001	Jockey International	0.141	0.100	Miocene, Lisbon
Jenkins	082-0002	Millen, City of	0.823	0.600	Floridan
Liberty	089-0001	Interstate Paper Corp	13.000	13.000	Floridan
Liberty	089-0002	Hinesville, City of	4.500	4.000	Floridan
Liberty	089-0003	Fort Stewart - Department of the Army	5.500	4.500	Floridan
Liberty	089-0004	Walthourville, City of	0.200	0.150	Floridan
Liberty	089-0005	Liberty County Industrial Authority	0.100	0.100	Floridan
McIntosh	098-0004	Greenwood Development	0.100	0.100	Floridan
Screven	124-0001	King Finishing Co - Div of Spartan Mills	3.720	2.930	Cretaceous Sand, Floridan
Screven	124-0003	Wall Timber Products	0.175	0.100	Floridan
Washington	150-0019	Davisboro, Town of	0.260	0.260	Cretaceous Sand

issued by EPD stipulate both the allowable monthly average and annual average withdrawal rates, standard and special conditions under which the permit is valid, and the expiration date of the permit. Ground water use reports are generally required of the applicant on a semi-annual basis. The objective here is the same as with surface water permits. A list of active Georgia municipal and industrial ground water withdrawal permits is provided in Table 3-6.

Farm Irrigation Permits

The 1988 Amendments to the Ground Water Use Act establishes the permitting authority within EPD to issue farm irrigation water use permits. As with the previously mentioned ground water permitting statute, the lower threshold is 100,000 GPD; however users of less water may apply and be granted a permit. Agricultural withdrawal permits are too numerous to list in this document.

Applicants for these permits who could establish that their use existed prior to July 1, 1988, *and* when their applications were received prior to July 1, 1991, were “grandfathered” for the operating capacity in place prior to July 1, 1988. Other applications are reviewed and granted with an eye towards protection of grandfathered users and the integrity of the resource. Generally, agricultural users are not required to submit any water use reports.

Excessive Ground Water Withdrawals

Excessive ground water withdrawal can lead to lowering or drawdown of the water table. Localized groundwater drawdowns are generally discovered only after the fact of permitting has occurred and withdrawal operations begun. To avoid such a possibility, if an application for a very large use of groundwater is received, the Water Resources Management Program of the Georgia EPD can take certain steps to possibly contain drawdowns effects. Modeling the hydrogeologic impact of such a large user may be required of the potential permittee. If this computer analysis indicates no unreasonable impact on existing users, such a water use permit may be approved. Another recommended possibility is a negotiated reduction in permit amounts to a more moderate amount of withdrawal, with lessened impacts. Prior to full scale production of a well field, well pumping tests run at or near actual production rates can be required. These may give the permittee and the EPD some real idea of the amount of water that may be pumped safely, without endangering other users nor drawing down the aquifer too greatly. Permit withdrawal limits may then be set at some safer yield which is determined by these pumping tests. These tests may also indicate that proposed pumping amounts may require more wells drilled to spread out the ultimate production impact on the aquifer.

References

Georgia Environmental Protection Division. 1987. Water Availability And Use Report, Coastal Plain River Basins.